Knowledge Networking: A Strategy to Improve Workplace Health & Safety Knowledge Transfer

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Abstract: This article proposes a Knowledge Networking approach to the development of Workplace Health & Safety Knowledge in order to overcome the limits and obstacles associated with the more traditional linear model of Knowledge Transfer in organisations. The province of Québec has developed a Network approach to managing workplace health and safety that is highly regarded by health & safety practitioners and researchers throughout Canada. Its research arm, the Robert Sauvé Research Institute on Workplace Health & Safety (IRSST) also uses a Knowledge Network approach to guide its research agenda. The success of those network initiatives has led the Eastern Canada Research Consortium on Workplace Health & Safety to create a Knowledge Transfer Research Laboratory (KTLab) to support research on the transfer of WHS best practices develop in Québec and elsewhere to Atlantic Canada using a networking approach.

Keywords: Knowledge Transfer, Knowledge Networks, Virtual Team, Workplace Health and Safety, Information Technology.

1. Introduction

How is new knowledge (i.e. research findings) about workplace health and safety transferred from the producer of that new knowledge to users of that knowledge? What are the factors that facilitate or impede health and safety knowledge transfer in and between organisations? How does knowledge about health and safety prevention gained in one culture get transferred to another culture? How does such knowledge developed in an industrialised setting transfer to a semi-rural or rural setting? How do we measure health and safety knowledge transfer? These are some of the questions the Knowledge Transfer Research Laboratory of the Eastern Canada Consortium on Workplace Health and Safety was created to address over the course of a five-year research project. Our investigation involves different levels of analysis, different theoretical perspectives and the use of different methodologies. We began our investigation by looking at what is known about knowledge transfer between individuals and organisations, followed by what is known about health and safety knowledge transfer between individuals and organisations and finally, we will identify important pieces of information needed to develop models and fill gaps in our understanding of this important organisational activity.

2. The knowledge transfer process

The ability to transfer knowledge from one organisational unit to another or from one organisation to another has been identified as a major contributor to organisational performance in many studies (Epple, Argote, & Murphy, 1996; Galbraith, 1990; Baum & Ingram, 1998; Darr, Argote, & Epple, 1995; Argote, Ingram, Levine & Moreland 2000; Goh, 2002; Dougherty, 1999). While most studies agree on the benefits of knowledge transfer in general, the effectiveness of knowledge transfer varies considerably among and between organisations (Argote, 1999; Szylanski, 1996). At its core the study of knowledge transfer is concerned with the process of moving useful information from one individual to another. It's not surprising that most of the literature on knowledge transfer has its roots in the field of psychology and predates the study of knowledge transfer in organisations by several decades (Argote, Ingram, Levine, & Moreland, 2000).

Early models of organisational knowledge transfer looked at knowledge as if it was an object that could be passed on from the creator to a translator who would adapt it in order to transmit the information to the user (Dissanayake, 1986). Within this paradigm, the user is viewed as a passive actor and the context within which the transfer occurs is completely ignored. This model implies a hierarchical top down relationship between the generator of knowledge who holds the resource (knowledge) and the user who is locked in a dependency stance (Roling, 1992; Boggs, 1992). In social sciences, this view tends to be even more pernicious because subjects can be assimilated to variables and loose their quality of actors on social reality.

Many reasons can be advanced to explain why knowledge transfer is so difficult within this paradigm. Some of these are related to the research itself, the way it is conducted and communicated to others. Other reasons are related to blockages and obstacles that can be found in organisations themselves. Let us first consider the relationship between the

researcher and the practitioner; a relationship that is often nonexistent.

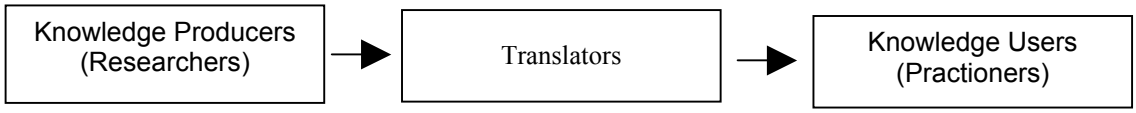

Figure 1: Linear Model of Knowledge Transfer

Research findings are typically communicated by specialists to a select group of peers who are interested by the subject matter, and who have the necessary expertise and knowledge to understand the jargon of the authors. Unfortunately, the research they produce provides answers to questions that were not necessarily posed by practitioners and managers, leaving unanswered most of the questions concerning intervention and action in the real world.

This gap between producers and users of knowledge can be partly explained by the divergent ways in which the two groups consider knowledge. Their concerns, values, interests and worldviews are different. Most theorists lack the practical knowledge of the field and many practitioners lack the theoretical support to frame their action. Argyris (1996) points out the difficulties and flaws related to the use of traditional empirical research in the development of what he called actionable knowledge. Table 1 below describes some of the researchers' and practitioners' divergent views on knowledge.

Table 1: Divergent views of knowledge

	Researchers	**Practitioners**
Concerns and interests	Discover scientific findings Describe and explain phenomena Develop valid and testable models Focus on publication in top journals	Reduce uncertainty Solve current problems immediately Gain organisational influence Improve practices Focus on bottom line
Attitude	Neutral stand favoring what seems to be objective Compare knowledge with literature	Normative stand favoring what seems to work Compare knowledge with experience
Problem formulation	Few variables with causal relationship Preference for objective, measurable data gathered in a standardised way	Multiple variables with systemic interactions Preference for subjective and experiential data gathered informally

Irwin and More (1991) proposed that we rely on specialists at organisational interfaces like "boundary spanners" or "linkage champions" to close the gap between providers and users of knowledge and technologies. Hargadon (1998) referred to them as “knowledge brokers”. These specialists interact with "gatekeepers" who screen information at the organisational border and select only the knowledge and technologies they consider useful to their organisation. Gatekeepers are informal leaders who play a determinant role in building norms within their peer group. McCormick (1990) showed that doctors look at their informal leaders to chose new practices because they cannot spend more time trying to stay up to date than practicing their profession. This view is still well alive despite numerous failures that were recorded with its use.

Recent models insist on the fact that the relationship between social systems that produce and use knowledge is not linear but circular. Hutchison and Huberman (1993) who conducted a lot of research on the transfer of knowledge in education, consider that users of knowledge are active problem solvers and generators of their own knowledge base instead of merely passive receptacles of information and expertise. Any knowledge is necessarily a product of cognitive processes and is linked to past learning.

Transferring knowledge implies much more than merely acknowledging the existence of new information. The creation and diffusion of true findings do not imply their adoption. For example, everybody knows that smoking has dangerous effects on health; however, this knowledge is not strong enough to stop many people from smoking. Another thousand findings on health impairment related to smoking will not make any difference. The challenge here is not the transfer of information, but the change of habit and the adoption of new behaviours. Even in the field of the transfer of technology, the real issue is

known for a long time not to be a technological but a human one (Bilynsky, 1990).

The process by which knowledge is transferred can be divided into six stages: generation, transformation, diffusion, reception, adoption and utilisation (Roy, Guindon et Fortier, 1995). These stages are not linear and iterations from one stage to the other are necessary to go from an initial idea to its application in the real world. The interaction between producers and users during each stage however will have a determining effect on the utilisation of knowledge afterward.

The participation of users at every phases of the knowledge development process has been identified as a key factor for its subsequent adoption (Johnston and Leenders, 1990; Irwin and More, 1991; Frambach, 1993). When users are involved from the beginning in a research project they are in better position to be interested by the end results. Informal communication networks are at the heart of the knowledge diffusion process; it is through them that peers stabilise behaviours and create group norms that will ultimately favor or hinder the adoption of knowledge (Havelock, 1986b; Henault, 1992). Openness to new knowledge (reception) is much easier when users need it. Understanding users need and providing information when the timing is appropriate is of prime importance and cannot be ignored by researchers (Cavanaugh, 1990; Datta, 1993).

The adoption and utilisation of new knowledge by a group or a society often means the rejection of past practices, which may also impact on current political, economical or cultural equilibrium in the social system. The legitimacy of a new knowledge is then validated according to the values, the beliefs and the culture of potential users (Roling, 1992). All these factors have to be taken into consideration if one wants to ease the process of generation, diffusion and utilisation of knowledge within target groups. Knowledge does not exist without the context in which it is used. In other words, we view knowledge less as a product or thing and more as a process used by a group of individuals to make sense of their world.

In this context we define knowledge as “an organised representation of reality held to be true either based on experimentation, experience, practice, science or beliefs”. Knowledge is then considered as the byproduct of interactions occurring between the actors trying to appreciate, name and act on reality, as they understand it. Practitioners, researchers and target groups are working together at every step of the process to produce knowledge that can be truly usable in practice. While the linear model was used in the past to illustrate the knowledge transfer process, we suggest the use of the network model to convey the idea that sharing information, points of view and understanding is the root of knowledge creation in societies. The greater the number of participants and level of activity around a specific subject in a particular network the better the chances of the knowledge created by that network has of being adopted.

Knowledge networking has been defined by Seufert, von Krogh, and Back (1999), as “signifying a number of people, resources and relationships among them, who are assembled in order to accumulate and use knowledge primarily by means of knowledge creation and tranfer processes, for the purpose of creating value.” In Canada, the Canadian Institutes of Health Research (CIHR) has popularised the term *knowledge translation* (KT) to refer to the complex set of interactions between producers of new health related knowledge and users of that new knowledge. In the context of the CIHR (2003), Knowledge Translation is defined as *the exchange, synthesis and ethically-sound application of knowledge – within a complex system of interactions among researchers and users – to accelerate the capture of the benefits of research for Canadians through improved health, more effective services and products, and a strengthened health care system.* In building its knowledge translation framework the CIHR has reinforced the need for the committed engagement of the full range of knowledge producers and users in developing tailored approaches to accommodate the unique relationships between pairs of sources and users.

The field of workplace health and safety research has remained underdeveloped in most of Canada, particularly when compared to the situation in European countries such as Sweden, Norway, Germany and France. This gap has been especially serious in Atlantic Canada where, until quite recently, there did not exist a single academic or governmental research unit specialising in workplace health and safety research and there were only minimal and poorly-funded efforts by the region’s provincial workers’ compensation agencies to bring in knowledge from research units operating elsewhere. Broad,

interdisciplinary and gender-informed research related to rural and remote, resource-based sectors is particularly lacking. It was in the hope of filling this gap that CIHR, in March 2001, funded a 'community alliance for health research' team based at Memorial University (SafetyNet).

To help in its efforts to improve the situation in Atlantic Canada and enhance interdisciplinary research and Knowledge Translation capacity related to workplace injury, SafetyNet joined up with two partners in 2002 to create the Eastern Canada Research Consortium on Workplace Health and Safety (WHS). It is comprised of the following three partners:

- The Community Research Alliance for Marine and Coastal Workplace Health and Safety in Atlantic Canada (SafetyNet), funded by CIHR, based at Memorial University in St. John's and linked to partner organisations and researchers in Newfoundland and Labrador, other parts of Atlantic Canada, Québec and Ontario;
- The Institut de recherche Robert-Sauvé en santé et en sécurité du travail (IRSST) in Montreal, Canada's largest independent WHS research institute; and
- The Chaire d'étude en organisation du travail (CEOT) in the Faculty of Business Administration at the Université de Sherbrooke in Sherbrooke, Québec. An additional collaborator in the Consortium is the Québec Network in Work Rehabilitation (Réseau en réadaptation au travail du Québec (RRTQ), which is linked to the Université de Sherbrooke

The first activity of the Consortium was to compare the workplace health and safety environment in Québec with that of Newfoundland. As mentioned earlier, in Québec there exists a long established tradition of collaboration and networking around health and safety issues. For example, in 1979 the Québec parliament passed an act establishing the base for a networked approach to managing workplace health and safety.

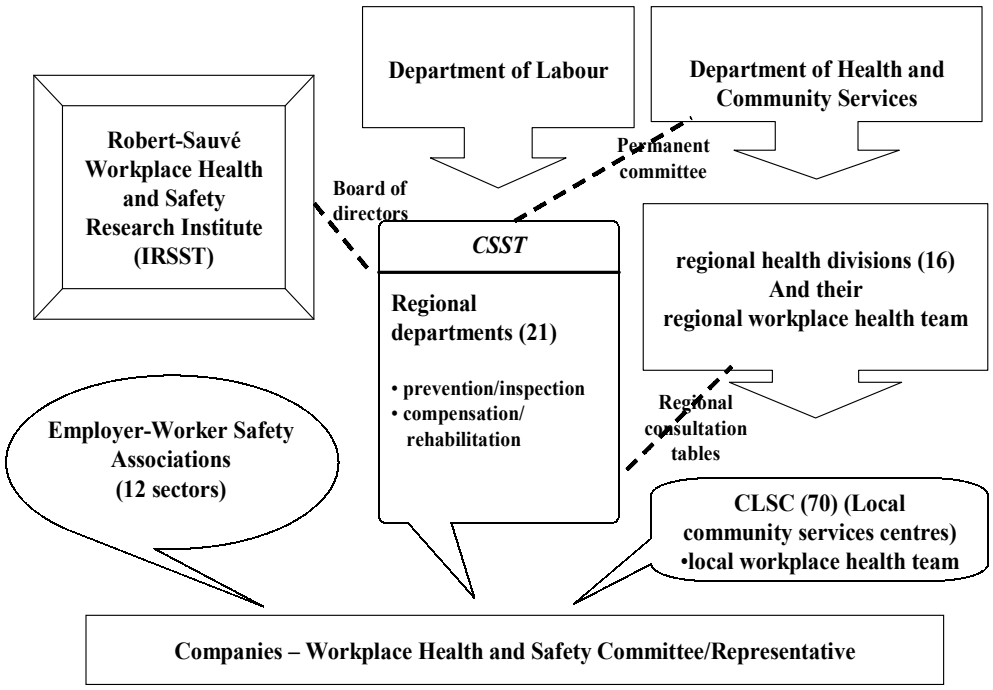

Figure 2: The Workplace Health and Safety Network in Quebec

Figure 2 illustrates the various components of the network and some of the relationships that it fosters. We can see clear links between all stakeholders of workplace health and safety, including the: Ministry of Labour, WHS Safety Commission, Employer-Employee Representatives, Healthcare Professionals, the Research Community and a variety of other government agencies. All of these organisations are involved to some degree in the prevention and management of workplace health and safety. Requests for research in health and safety can come from any part of the network, although in 1995 the IRSST decided to adopt a knowledge network approach to research that requires most research initiatives to involve all stakeholders of a particular research issue in the entire research protocol from the outset of the project. In this way the IRSST increased the

likelihood that the research it produces will ultimately be utilised. Prior to 1995 much of the research was done from the researchers' perspective who then tried to push the research results onto the practitioner community. After 1995 the knowledge network began exerting a pull influence on the research agenda, which meant that the end users became increasingly interested in the findings of the research projects. Along with that early involvement has come a significant increase in the knowledge transfer of research results.

In Newfoundland & Labrador, on the other hand, there is no such tradition of networking and collaboration although serious signs of a willingness to collaborate are becoming increasingly evident. The major difference between the WHS networks in Québec and Newfoundland & Labrador centre around the strong presence of employer representatives in Québec and very little or no presence in Newfoundland and Labrador. For example, there are 12 joint sector associations in Québec and only two or thee similar associations in Newfoundland and Labrador. There is also no equivalent research association to the IRSST in Newfoundland and Labrador as well as no links to local workplace health teams. Determining the type of WHS Knowledge Network required in Newfoundland and Labrador will constitute the main focus of the work of the Consortium in the months ahead.

The Consortium is designed to foster the rapid transfer of WHS research results from the IRSST to Atlantic Canadian researchers, community partners and workplaces. It is in the process of identifying the best practices for KT developed in Québec, with its long established tradition of university-government-workplace collaboration, adapting these best practices for rural and remote, resource-dependent environments and use action-research methods to test these KT practices and refine them. Working together, the researchers in the Consortium will develop new models for the analysis and prevention of workplace injuries, disabilities and diseases and apply these methods to a broader range of Atlantic Canada's economic sectors than those currently being studied by SafetyNet.

The Consortium combines the capacities and the needs of the partners into a Knowledge Network of producers and users of new workplace healthy and safety knowledge and creates an environment of shared 'virtual' structures to enhance capacity in Atlantic Canada. Figure 3 below shows the initial knowledge-sharing network developed by the Consortium.

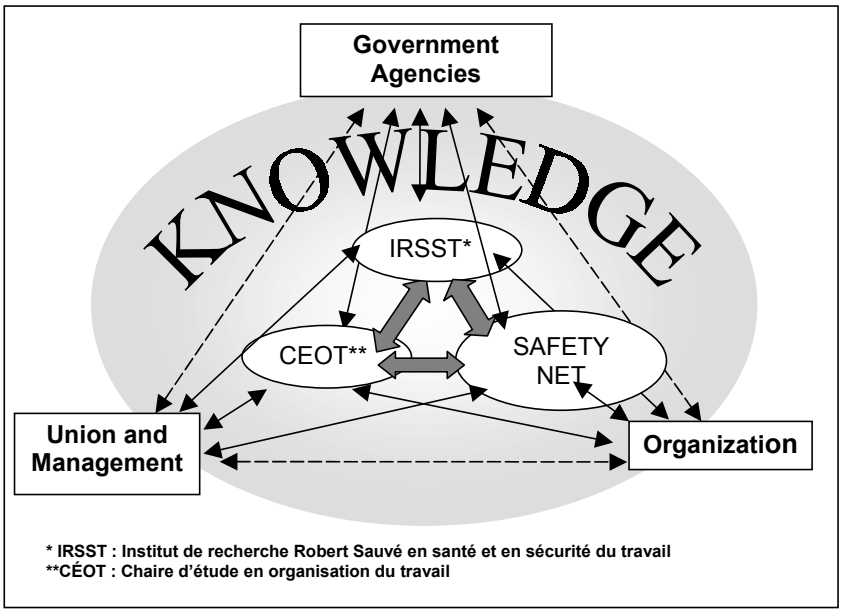

Figure 3: Eastern Canada Consortium on Workplace Health and Safety

In contrast to earlier linear models of knowledge-transfer where knowledge was viewed as unidirectional, top down, this networked model illustrates clearly the intent of Consortium partners to fully and equally involve both producers and users of new knowledge at every level of a knowledge-based view of workplace health and safety research. We believe the Knowledge Network model is exceptionally well suited to work of

the Consortium. By fostering open and frequent communications among network members the Consortium hopes to create a knowledge-sharing environment that will go a long way in improving the health and safety of our fellow citizens.

The work of the Consortium will also benefit WHS research and injury prevention in Canada as a whole by transferring to English Canada a body of research and a set of innovative methodologies that have been largely confined to French-speaking Québec. IRSST has produced a substantial volume of important research reports and several innovative prevention tools relevant to resource-based occupations but most of these are not disseminated in English and are not widely known to scholars, decision-makers and workplace partners outside Québec.

2.1 Specific consortium objectives

- To add new, interdisciplinary research and KT capacity related to workplace injury and permanent structures for ongoing capacity enhancement linking the participating organisations;
- To build a network of research and community WHS collaborators in Atlantic Canada linked to the three Québec research organisations with their established social capital of community and institutional connections, thus creating a truly Eastern Canadian regional organisation;
- To enhance the capacity of researchers and decision makers in Atlantic Canada to work together more effectively in the field of WHS by transferring models and techniques developed in Québec and adapting them to Atlantic Canadian contexts;
- To combine the KT expertise of the two Quebec partners with the emerging skills and partnerships of SafetyNet to develop methods for knowledge translation from researchers to industry and workplaces—methods specifically adapted to rural and remote locations, resource-based industries and small enterprises;
- To develop new, gender-informed methods for the analysis, prevention, treatment and rehabilitation of occupational accidents and illnesses, methods specifically designed for rural and remote, resource-based industries and small enterprises;
- To apply these methods to new problems and sectors, by developing collaborative pilot projects drawing on the skills and resources of Consortium members including many who will be newly recruited and/or retrained collaborators of SafetyNet, and by securing additional grant funding to pursue these projects;
- To bring to English-speaking Canada a body of research results, methods and tools in WHS and KT largely unknown outside Québec, by translating and transferring the work of the IRSST, CEOT and RRTQ.

3. Knowledge translation research laboratory

To help conduct and direct research in Knowledge Transfer the Consortium has created the WHS Knowledge Translation Research Laboratory, housed at the Université de Sherbrooke but also operating as a virtual, multi-site laboratory with ongoing electronic and in-person participation by researchers and staff from all partner organisations. The overall mandate of the KT Research Laboratory is to excel, according to internationally accepted scientific standards, in research on the translation of new knowledge into improved methods of prevention and management in WHS. The specific objectives of the KT Research Laboratory will be:

- To increase understanding of the theory and practice of KT as it applies to WHS;
- To develop and evaluate new KT tools and strategies fitting the objectives of the Consortium, building on the strength of existing knowledge such as that of the IRSST;
- To integrate an understanding of KT principles and practices into the training and continuing education of WHS professionals.

4. Virtual teaming and collaboration tools

Building on the belief that knowledge is best shared, and learning most effectively generated when people sharing common interests work together to solve problems, the KT laboratory has developed a virtual office using new Information Technology tools (i.e. Sametime, Quick place) to support knowledge-sharing and distance collaboration for members of the Consortium. It contains general information on all facets of the Consortium's work as well as specific, secure, team related information pertaining to the

multitude of projects the Consortium is involved in. Teams can easily use or create a workspace to help members communicate with one another, share information and resources, insure follow-up to meetings and activities and deliver projects on time. The only requirement for members to access the Lab support system is an Internet connection. The intranet site makes it possible to organise video conferences between participants from their computer desktop.

Through this technology the Consortium hopes to create a "network" environment in which researchers are encouraged to involve potential users of the research findings (new knowledge) at every stage of the research process. We also intend to encourage the creation of workplace health and safety networks throughout Eastern Canada to encourage what Kogut and Zander (1996) refer to as the "shared identity" of network members. This "shared identity" to a network according to Kogut and Zander (1996) establishes tacit and explicit rules of coordination through which knowledge is most effectively generated combined, and transferred by individuals who identify with the larger network. Although Kogut and Zander applied the concept of "shared identity" to firms, we believe, as does Dyer and Nobeoka (2000) who've studied the Toyota Knowledge–Sharing Network extensively, that "shared identity" applies equally well to networks to which members are strongly linked through a common purpose. A network that succeeds at creating a "shared identity" amongst its members increases the opportunity for knowledge to be transferred. The virtual site is intended to support that "shared identity" by improving production, diffusion and utilisation of knowledge in the area of workplace health and safety. All present and future partners in the Consortium will be trained in the use of the technology. The challenge is to create a network, process and environment that can induce continuous sharing and learning for all present and future Consortium partners.

The KT Lab will also help SafetyNet refine the IRSST best practices to optimise them for use in Newfoundland and Labrador, particularly for workplaces with male and female workers in the workplaces that characterise much of the Atlantic Canadian economy and some parts of Quebec. Careful attention will be paid to the ways in which sectors, firms and communities in Newfoundland and Labrador (and Atlantic Canada as a whole) differ administratively, organisationally and culturally from their counterparts in Québec.

The Eastern Canada Consortium on Workplace Health and Safety is a multi-site, bilingual, multi-province network that has been designed to make a significant contribution to the ability of researchers in the region to do cutting-edge, interdisciplinary work on the analysis and prevention of injuries in the workplace and to get the results of that research into the hands of decision makers and workplace users as soon after the research as possible. The measure of effectiveness of the knowledge transfer activities included in this research will reside in the changes in knowledge or changes in performance of both producers and users of that knowledge.

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